

## **TYPHOON KYLE (25W)**

### **I. HIGHLIGHTS**

Kyle generated from a disturbance in the monsoon trough 600 nm (1110 km) east of Guam. Separating from the trough, the cloud system gained organization and began to track along the southern edge of the subtropical ridge to its northeast. The subtropical ridge and a series of fast moving mid-latitude short-wave troughs strongly influenced Kyle's track. The tropical cyclone passed through the northern Mariana Islands, causing minimal damage, intensified into a typhoon, and recurved several hundred miles east of Japan.

### **II. CHRONOLOGY OF EVENTS**

140600Z - First mentioned on the Significant Tropical Weather Advisory as having fair potential for development due to its favorable location east of a TUTT cyclone.

150500Z - Tropical Cyclone Formation Alert issued based on first Dvorak intensity estimate of CI 1.0.

160000Z - First warning issued following intensity estimate of CI 1.5.

161800Z - Upgraded to tropical storm due to Dvorak current intensity estimate of 2.5.

180600Z - Upgrade to typhoon based on a CI 4.0 and weaker vertical shear.

190000Z - Peak intensity - 90 kt (45 m/sec) - followed on Dvorak current intensity of 5.0.

221200Z - Downgraded to tropical storm after the eye disappeared and interaction began with mid-latitude trough to the north.

221800Z - Final warning issued as Kyle underwent extratropical transition.

### **III. TRACK AND MOTION**

Kyle formed at the eastern end of the monsoon trough. As the circulation consolidated and separated from the trough, it began to track west-northwestward under the influence of the mid-tropospheric subtropical ridge. On 16 October Kyle was headed directly towards the island of Saipan, which is located 100 nm (185 km) north-northeast of Guam. A mid-latitude short-wave trough approaching from Asia weakened the subtropical ridge and caused the tropical cyclone to slow and turn northwestward over the northern Marianas. The tropical cyclone continued to track northwestward along the western edge of the ridge and recurved on 20 October. Kyle maintained its tropical characteristics until extratropical transition occurred on 22 October.

### **IV. INTENSITY**

Until 16 October, Kyle encountered upper-level wind shear which restricted its outflow to the west. Then the vertical wind shear lessened, Kyle intensified and interlocking cloud bands formed. A small eye was briefly observed on the 18 October satellite images, but disappeared into the ragged central dense overcast as the short wave approached from the northwest. Twenty-four hours later, after the short wave exited the area, the eye reappeared. As Kyle moved into higher latitudes, its eye became elongated due to pressure from increasing westerly winds aloft. Gradual weakening accompanied this interaction (Figure 3-25-1) and Kyle became extratropical on 22 October.

### **V. FORECASTING PERFORMANCE**

JTWC beat all the objective aids with overall errors of 98 nm (181 km), 166 nm (307 km), and 196 nm (363 km) at 24, 48 and 72 hours, respectively. However, JTWC forecasters missed the turning point to the northwest on 16 October (Figure 3-25-2). The half persistence/half climatology model, HPAC, suggested a sharper turn than that predicted by the dynamical models, OTCM and FBAM. JTWC relied on the guidance from OTCM, since the ridge was not anticipated to weaken as drastically as it did. Later, JTWC forecasters accurately predicted the time and point of recurvature on 20 October,

achieving 72-hour forecast errors of less than 100 nm (185 km) for 3 consecutive warnings, beginning 60 hours prior to the event.

#### VI. IMPACT

No information was received.

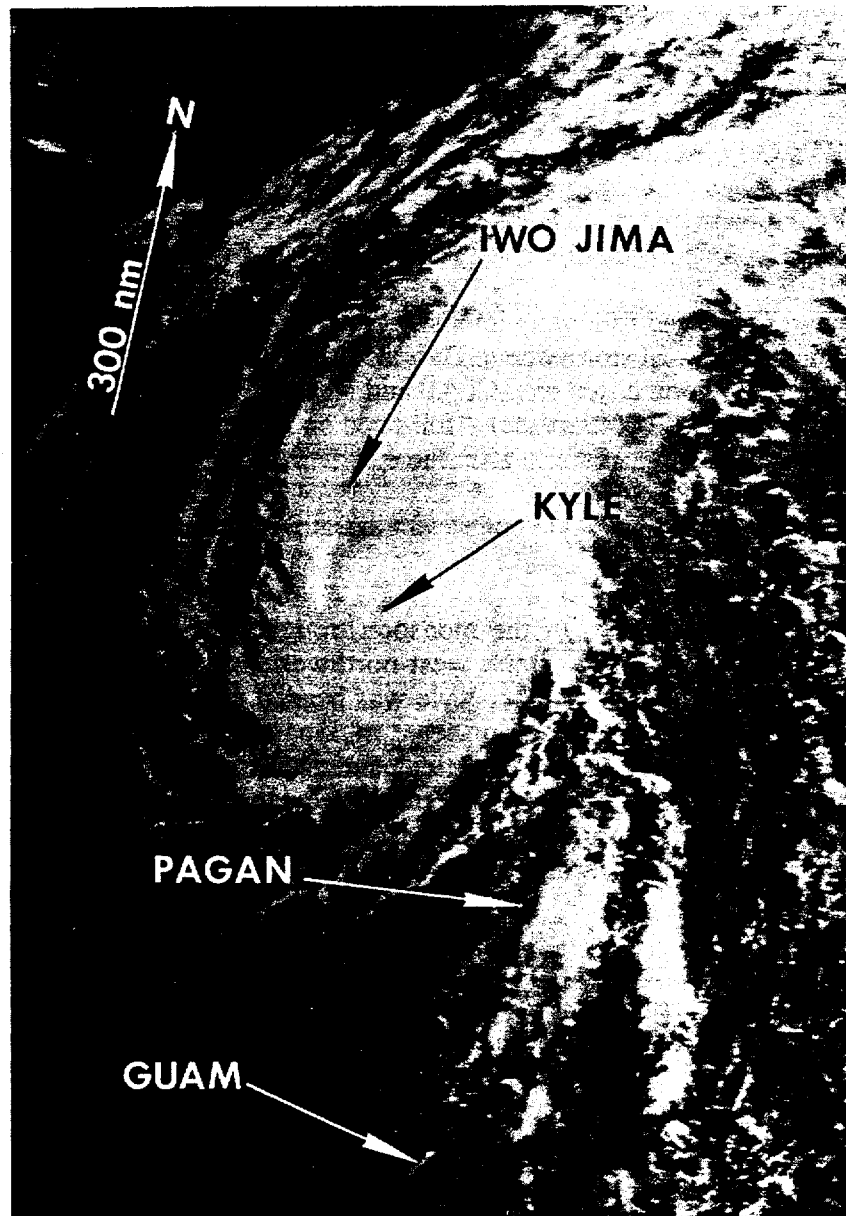


Figure 3-25-1. Typhoon Kyle with elongated eye begins to interact with a frontal system moving southeastward from Japan (200439Z October NOAA visual imagery).

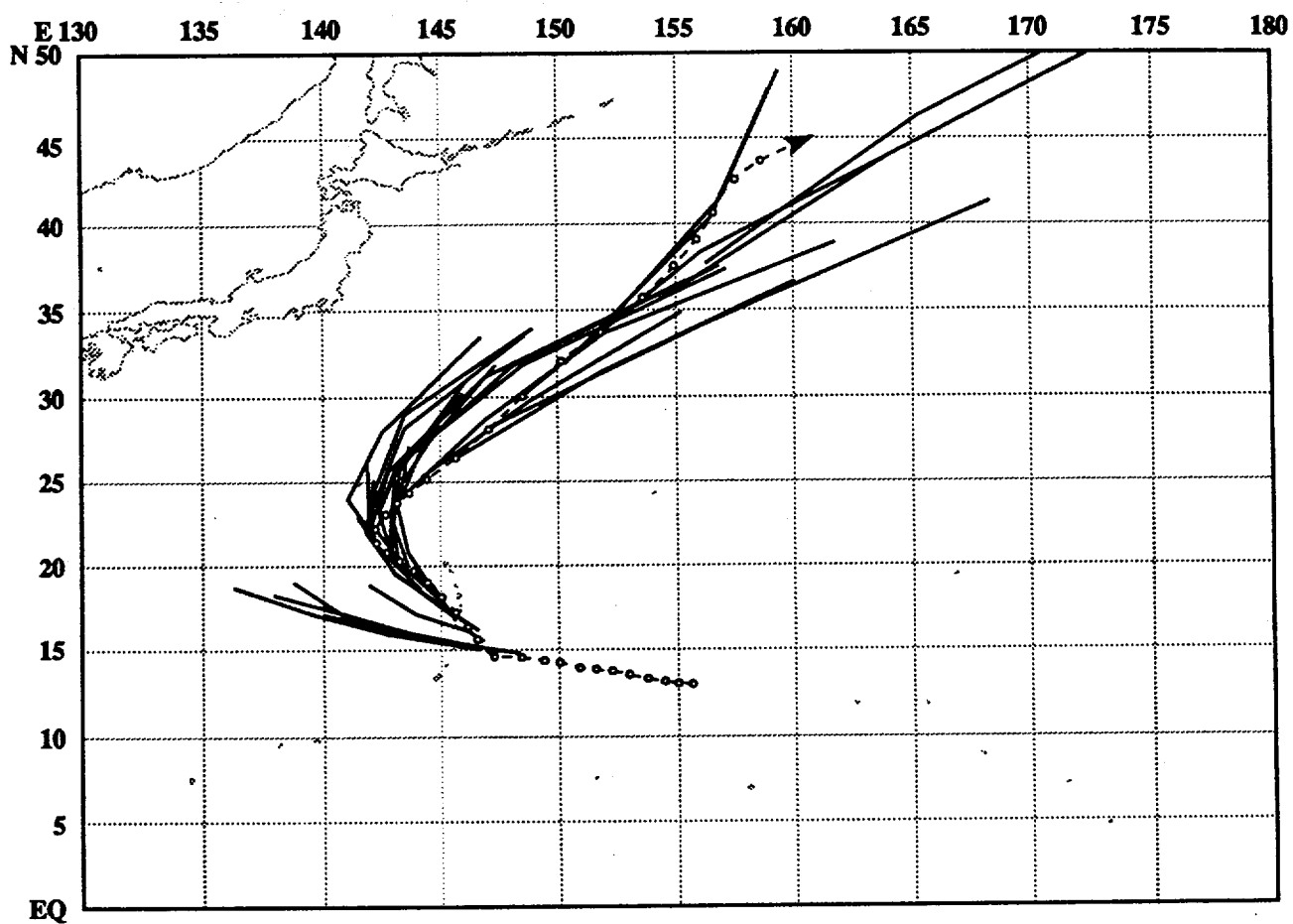


Figure 3-25-2. The overall JTWC forecast performance (solid lines) is superimposed on the final best track (dashed line).